Successful Endovascular Occlusion of a Ruptured Distal Anterior Inferior Cerebellar Artery Aneurysm of the Caudal Trunk: Case Report

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Summary

We report a rare case of a ruptured distal anterior inferior cerebellar artery (possibly dissecting) aneurysm of the caudal trunk, successfully treated by endovascular occlusion. A 41-year-old man presented with sudden severe headache and drowsiness.

On the day of ictus, conventional angiography was performed to make the above diagnosis, followed by endovascular occlusion of the sac and the parent artery.

The patient recovered completely without any neurologic deficit after treatment. Endovascular occlusion could be a safe and effective treatment option in a case of a ruptured distal AICA aneurysm of the caudal trunk.

Introduction

Distal aneurysms of the anterior inferior cerebellar artery (AICA) are rare, and those arising from the caudal trunk of AICA are even rarer [1]. Surgical treatment of distal AICA aneurysms is not infrequently associated with complications, such as hearing loss and facial palsy [2]. Moreover, occlusion of the aneurysm can be difficult by surgical means [3,4]. We report a case of distal AICA aneurysm of the caudal trunk successfully treated with endovascular occlusion with a review of the literature.

Case Report

A 41-year-old man presented with subarachnoid hemorrhage. Sudden severe headache was the initial complaint. At admission he was drowsy showing no other specific neurologic abnormality except for nuchal rigidity. Diffuse dense subarachnoid hemorrhage was noted on computed tomography (CT), with thick hematoma at the right cerebellopontine and ambient cisterns. Intraventricular blood clot was also demonstrated within the fourth and third ventricles and frontal horns and bodies of both lateral ventricles, with slight enlargement of the latter.

Vertebral angiography revealed an aneurysm at the distal anterior inferior cerebellar artery (AICA) on the right side (figure 1). The aneurysm arose from the larger caudal trunk of the AICA, with no associated branch around it. The arterial wall opposite the aneurysm also looked irregular, which indicated that the aneurysm might be a dissecting aneurysm. The posterior inferior cerebellar artery (PICA) of extracranial origin was present on the right side but did not contribute to the cerebellar hemispheric perfusion.

Under general anesthesia a 5-Fr guiding catheter (Envoy; Cordis Neurovascular, Miami Lakes, FL) was navigated via a transfemoral arterial access over 0.035-inch hydrophilic gui-

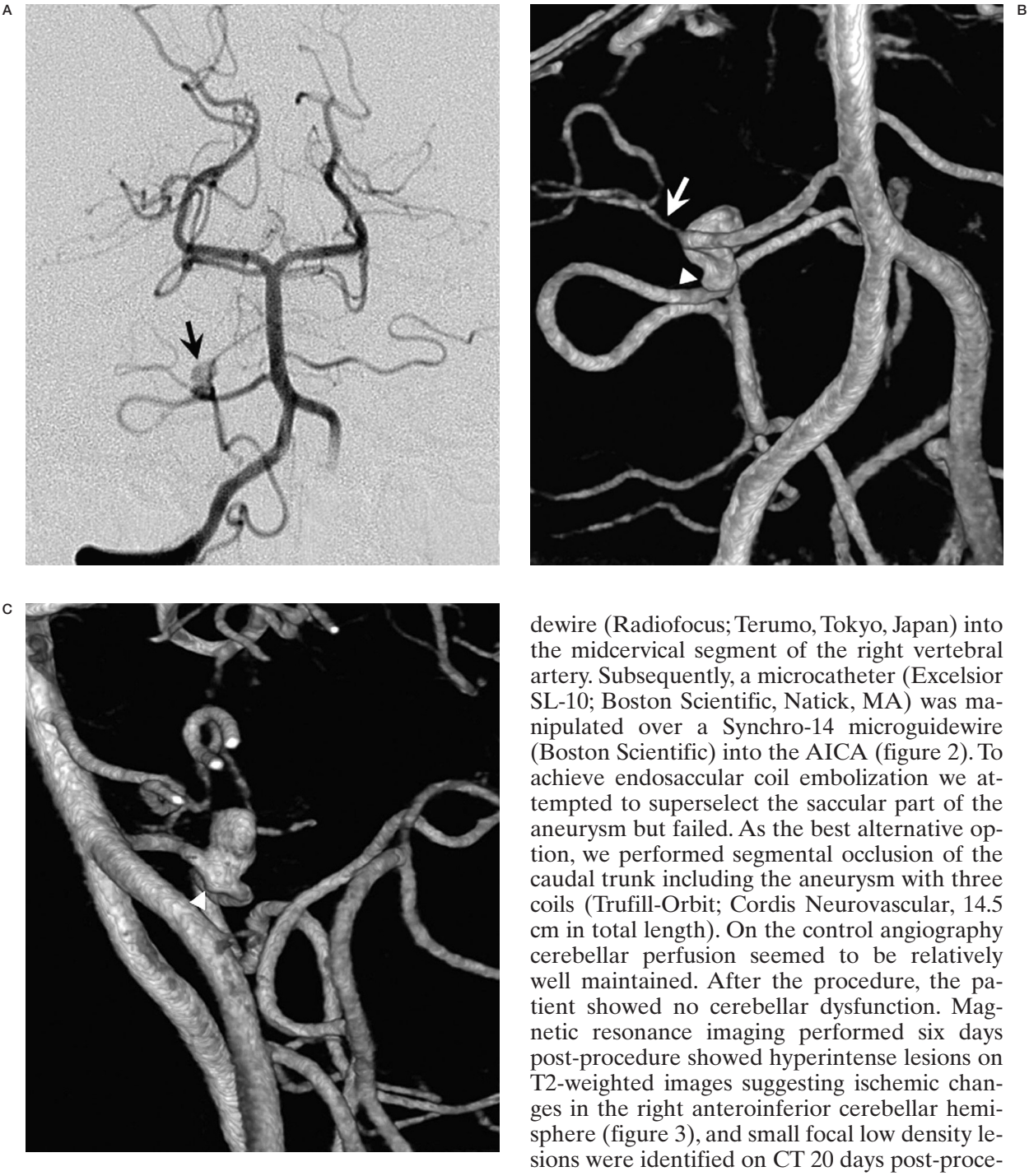

Figure 1 A) Right vertebral angiogram showing an aneurysm (arrow) at distal part of the right anterior inferior cerebellar artery (AICA). Right posterior inferior cerebellar artery arising form the extracranial vertebral artery is also noted. B,C) On the three-dimensional reconstructed images from rotational angiography revealing the aneurysm protruding from the caudal trunk of AICA from the anterior (B) and left lateral (C) views. The smaller rostral trunk is seen (arrow). The lobulation on the parent arterial wall is also noted (arrowhead).

dewire (Radiofocus; Terumo, Tokyo, Japan) into the midcervical segment of the right vertebral artery. Subsequently, a microcatheter (Excelsior SL-10; Boston Scientific, Natick, MA) was manipulated over a Synchro-14 microguidewire (Boston Scientific) into the AICA (figure 2). To achieve endosaccular coil embolization we attempted to superselect the saccular part of the aneurysm but failed. As the best alternative option, we performed segmental occlusion of the caudal trunk including the aneurysm with three coils (Trufill-Orbit; Cordis Neurovascular, 14.5 cm in total length). On the control angiography cerebellar perfusion seemed to be relatively well maintained. After the procedure, the patient showed no cerebellar dysfunction. Magnetic resonance imaging performed six days post-procedure showed hyperintense lesions on T2-weighted images suggesting ischemic changes in the right anteroinferior cerebellar hemisphere (figure 3), and small focal low density lesions were identified on CT 20 days post-procedure. The patient underwent shunt operation during the hospital stay and was discharged home with no neurologic deficit.

Discussion

Among the intracranial aneurysms, those located at the AICA are extremely rare, compris-

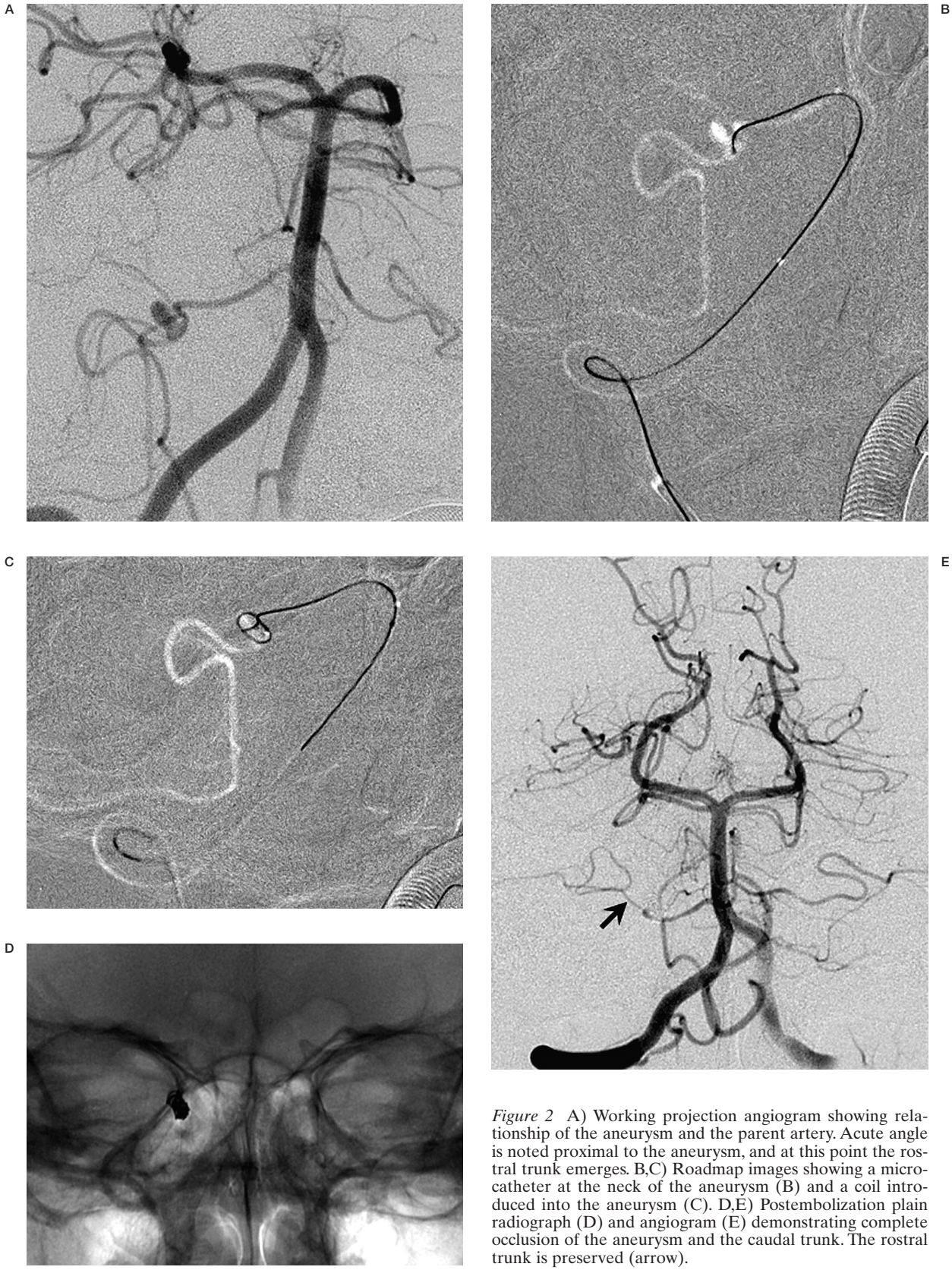

Figure 2 A) Working projection angiogram showing relationship of the aneurysm and the parent artery. Acute angle is noted proximal to the aneurysm, and at this point the rostral trunk emerges. B,C) Roadmap images showing a microcatheter at the neck of the aneurysm (B) and a coil introduced into the aneurysm (C). D,E) Postembolization plain radiograph (D) and angiogram (E) demonstrating complete occlusion of the aneurysm and the caudal trunk. The rostral trunk is preserved (arrow).

ing only 0.5% (22/4500)[5]; of the major arteries of the posterior fossa, the AICA is the least likely to harbor an aneurysm[4]. Distal, or peripheral, AICA aneurysms (those located during the arterial course after emergence from the basilar artery) are even rarer than proximal ones (those located at the emergence of the AICA from the basilar artery)[2]. Krayenbuhl and Yasargil's report is said to be the first to document a distal AICA aneurysm angiographically in 1957[4]. In a large series of AICA aneurysms, distal aneurysms accounted for only 12% (4/34)[2].

Distal AICA aneurysms are reported to occur three times more frequently in females[1,6]. In a review, mean age was 46 years (20-72 years), and hearing loss and facial palsy were present in 69% (22/32) and 63% (20/32) of the cases respectively at time of presentation[6]. Most of the distal AICA aneurysms involve the rostrolateral trunk rather than caudomedial trunk[6], and 80% of distal AICA aneurysms arise at or adjacent to the branching point of the internal auditory artery[1]. These data support the close relationship between the location of aneurysms and related deficits. In our case the aneurysm arose from the caudal trunk, several millimeters distal to branching point of the rostral trunk, and no cranial nerve deficit was found at the time of presentation.

Surgical approaches to the AICA aneurysms are challenging and not without complication[2]. In a recent series, the neurological complication rate amounted to 56% (18/34), with the most common complication being cranial nerve deficits (68%, 15/18), especially sixth cranial nerve palsy[2]. In four cases of distal AICA aneurysms, the Glasgow Outcome Scale scores at discharge were 4 in two cases, 3 in one, and 2 in the other[2]. Moreover, delayed surgery has been frequently adopted for these lesions[5]; as a result, half of the patients with ruptured aneurysms had multiple bleeds in a series.

We performed endovascular segmental occlusion of the lesion on the day of presentation without delay, and attained an excellent clinical outcome of the patient. Several authors have reported endovascular occlusion of the peripheral AICA aneurysms with good results[3,4,7,8] (see Table). Cloft et Al[3] occluded the parent artery as close as possible to the aneurysmal neck in a case of distal AICA aneurysm which bled after partial clipping, resulting in complete recovery except for postsurgical hearing loss.

Table **Cases of distal anterior inferior cerebellar artery aneurysms treated by endovascular coil embolization from the literature.**

Author	No.	Method	Postembo. new deficit	Comment
Cloft et Al	1	Parent artery occlusion	None	After partial clipping & aneurysm rupture
Eckard et Al	2	Parent artery occlusion	Hearing loss	-
Zager et Al	3	Parent artery occlusion	None	After attempted clipping; Recovery from 6th & 7th cranial nerve deficits
Lubicz et Al	4	Aneurysmal occlusion	None	Further thrombosis in neck remnant
	5	Parent artery occlusion	Facial palsy	-
Choi et Al	6	Aneurysmal occlusion	None	Rebleeding; Complete recovery following parent artery occlusion
Kang et Al	7	Parent artery occlusion	None	-

**Postembo, postembolization*

Eckard et Al [7] performed coil occlusion of the parent artery in a case of distal AICA aneurysm, resulting in ipsilateral decreased hearing, which had been provoked by Amytal injection before occlusion. Zager et Al [4] reported a case of postsurgical distal AICA aneurysm who underwent segmental occlusion with coils and recovered completely. Lubicz et Al [8] treated two cases of distal AICA aneurysms, one by selective endosaccular embolization and the other by nonselective parent artery occlusion.

The latter case developed facial palsy one day after the treatment. Among various materials for embolization, coils have been preferred to glues and balloons for treatment of peripheral arterial aneurysms because coils can be placed more precisely with less chance of distal embolization compared to glues and because navigation of balloons would be impossible in peripheral branches of small diameters [7].

During the interventional procedure for the distal AICA aneurysm we encountered some problems. First, we had difficulty in obtaining a good roadmap image once the microcatheter had been introduced into the AICA because of decreased blood flow of the AICA by the microcatheter. Instead, the roadmap image could be obtained by injecting a small amount of contrast media by the microcatheter. Injection into a probably dissected artery may be dangerous. Therefore, a gentle injection would be required in this situation. Second, the tip-shaped microcatheter would not be steered by wire torque due to the small caliber of the parent artery. We managed to introduce a coil or a wire into the aneurysm, but not the microcatheter. However, there was no technical difficulty in occlusion of a segment of the parent artery and the aneurysmal sac together.

When performing coil embolization for treatment of distal AICA aneurysms, the best option may be endosaccular embolization rather than trapping or parent artery occlusion to avoid possible complications such as hearing loss, facial palsy and cerebellar dysfunction. However, when the first option is not feasible, seg-

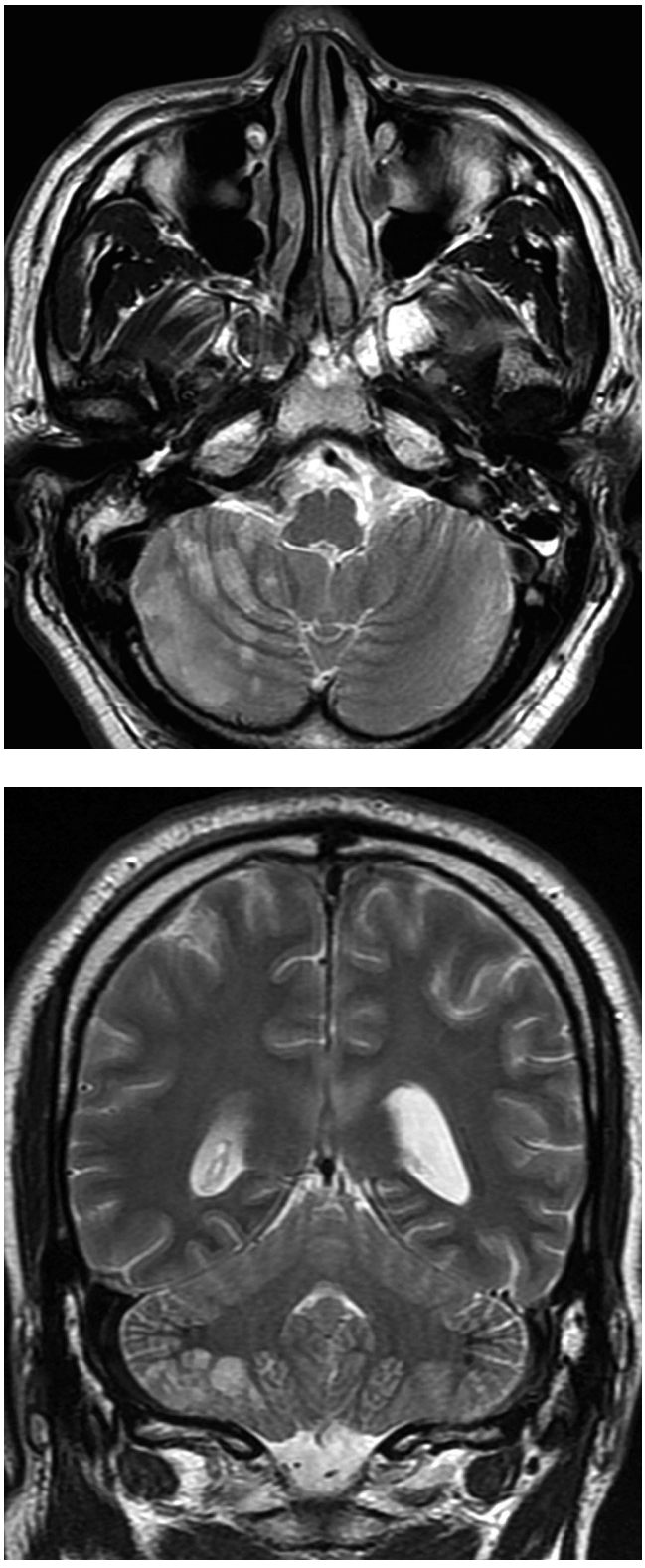

Figure 3 Magnetic resonance images (T2-weighted) showing ischemic lesions at the inferior aspect of the right cerebellar hemisphere on axial (A) and coronal (B) views.

mental occlusion can be the best alternative and might be better than incomplete intraaneurysmal embolization[9]. Among the seven cases who underwent coil embolization for distal AICA aneurysms (our case and six cases from the literature), there was no mortality and two cases (29%) developed postprocedural cranial nerve deficits.

During the interventional procedures for distal AICA aneurysms every effort should be made not to impair perfusion to internal auditory artery to preserve hearing. In our case the aneurysm arose from the caudal trunk, and segmental occlusion could be performed without cranial nerve deficit or cerebellar dysfunction after treatment.

Conclusions

Endovascular occlusion of the sac and the artery seems to be a safe and effective treatment option in cases of ruptured distal AICA aneurysms, especially if the aneurysms arise from the caudal trunk.

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